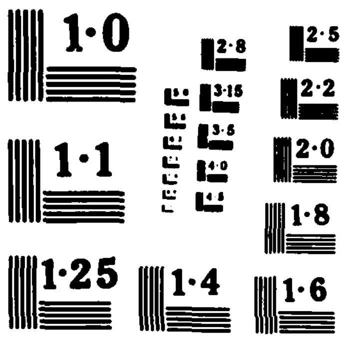
AD-A157 502 SPECIAL FLOOD HAZARD EVALUATION REPORT OWASCO INLET VILLAGE OF GROTON TOMPKINS COUNTY NEW YORK(U) CORPS OF ENGINEERS BUFFALO NY BUFFALO DISTRICT MAY 85 1/1

UNCLASSIFIED F/G 8/8 NL

END



NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

2

OWASCO INLET

Village of Groton
Tompkins County
New York

Prepared

for the Village of Groton

US Army Corps
of Engineers
Buffalo District

May 1985

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Special Flood Hazard Evaluation Report Owasco Inlet, Village of Groton, Tompkins County, New York. May 1985		5. TYPE OF REPORT & PERIOD COVERED Special Flood Hazard Evaluation
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)		8. CONTRACT OR GRANT NUMBER(s) N/A
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Army Corps of Engineers 1776 Niagara St. Buffalo , N Y 14207		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE May 1985
		13. NUMBER OF PAGES 12 pgs. 3 plates
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report)
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Owasco Inlet, Groton, NY, flood plain management, history of flooding, flood profiles, flooded areas

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This Speical Flood Hazard Evaluation Report, investigates the potential flood situation along Owasco Inlet within the corporate limits. Although large floods have occurred, studies indicate that even larger floods are possible. This report includes a history of flooding along Owasco Inlet and identifies those areas that are subject to possible future floods. Special emphasis is given to those floods through the use of maps and water surface profiles. Report furnishes a suitable basis for the adoption of land use controls to guide flood plain development and thereby prevents intensification of the

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

20. Continued.

flood loss problem. It will also aid in the development of other flood damage reduction techniques to modify flooding and reduce flood damages which might be embodied in an overall Flood Plain Management(FPM) program. Other types of studies, such as those of environmental attributes and the current and future land use role of the flood plain as part of its surroundings, would also profit from this informantion.

A-1

SPECIAL FLOOD HAZARD
EVALUATION REPORT

OWASCO INLET
VILLAGE OF GROTON
TOMPKINS COUNTY, NY

TABLE OF CONTENTS

TABLES

TABLE OF CONTENTS (Cont'd)

Description

PLATES

SPECIAL FLOOD HAZARD
EVALUATION REPORT

OWASCO INLET
VILLAGE OF GROTON
TOMPKINS COUNTY, NY

INTRODUCTION

This Special Flood Hazard Evaluation Report, prepared at the request of the village of Groton, investigates the potential flood situation along Owasco Inlet within the corporate limits. Most of the area along the stream from the northern corporate limit to about 1,000 feet upstream from South Street (Route 38) is commercial or residential. South of this reach, to the southern corporate limit, is mostly undeveloped. Although large floods have occurred, studies indicate that even larger floods are possible.

Knowledge of potential floods and flood hazards is important in land use planning. This report includes a history of flooding along Owasco Inlet and identifies those areas that are subject to possible future floods. Special emphasis is given to those floods through the use of maps and water surface profiles. While the report does not provide solutions to flood problems, it does furnish a suitable basis for the adoption of land use controls to guide flood plain development and thereby prevents intensification of the flood loss problem. It will also aid in the development of other flood damage reduction techniques to modify flooding and reduce flood damages which might be embodied in an overall Flood Plain Management (FPM) program. Other types of studies, such as those of environmental attributes and the current and future land use role of the flood plain as part of its surroundings, would also profit from this information.

Additional copies of this report can be obtained from the village of Groton until its supply is exhausted and the National Technical Information Service of the U.S. Dept. of Commerce, Springfield, VA 22161, at the cost of reproducing the report. The Buffalo District Corps of Engineers will provide technical assistance and guidance to planning agencies in the interpretation and use of the data.

PAST FLOODS

Major floods can occur along Owasco Inlet during any season of the year. Floods in the watershed can be caused by intense localized thunderstorms or moderate rains on snow covered ground. Large floods occurred in the watershed in 1905, 1922, 1935, 1972, 1975, and 1981.

The June 1905 flood was caused by a cloudburst type rainfall centered near the headwaters of Mill Creek. Moravia, which is downstream from Groton, suffered the most damages.

In August 1922, a flood occurred which badly damaged the former American Road Machinery factory, which was located at the present site of the senior citizens housing complex.

The July 1935 flood was caused by a series of heavy thunderstorms occurring during the period of 6-9 July. The southern portion of the Owasco Inlet Watershed had rainfall in excess of 9 inches and serious flooding occurred in Moravia, Locke, and Groton.

More than 5 inches of rain fell at Locke during tropical storm "Agnes" in June 1972. Tompkins and Cayuga Counties were both declared disaster areas.

Again in September 1975, more than 5 inches of rain fell at Locke from Hurricane Eloise. Flooding occurred all along Owasco Inlet. Cayuga and Tompkins Counties were declared disaster areas. The flooding from "Eloise" was worse than from "Agnes" in the watershed.

From all indications, the October 1981 flood was the worst ever suffered in Groton. The flood was in excess of the 100-year flood for this area. The senior citizens housing complex just north of West South Street and west of Owasco Inlet was flooded to a depth of several feet. Homes and businesses were flooded. One home downstream from Cortland Street was undermined and collapsed from the rushing floodwaters. Damages approached $3,000,000 for the village.

FUTURE FLOODS

Floods of the same or larger magnitude as those that have occurred in the past are likely to occur in the future. Floods larger than those on Owasco Inlet have been experienced in the past on streams with similar geographical and physiographical characteristics as those found in the study area. Similar combinations of rainfall and runoff which caused these floods could occur within the study area. To assess the flooding potential of the study area, it is necessary to consider storms and floods that have occurred in regions with the same topography, watershed cover, and physical characteristics.

Flood Magnitudes and Their Frequencies

Floods are classified on the basis of their frequency or return period. A 100-year flood is an event whose magnitude can be expected to be exceeded on the average of once every hundred years. The 100-year event has a 1 percent chance of exceedence in any given year. It is important to note that, while on a long-term basis the exceedence averages out to once per hundred years, floods of this magnitude can occur in any given year or even in consecutive years and within any given time interval.

Similarly, the 10, 50, and 500-year flood events are those floods whose magnitudes can, in the long term, be expected to be exceeded on the average of once in every 10, 50, and 500 years, respectivley.

It should be noted that there is a greater than 50 percent probability that a 100-year flood event will occur during a 70-year lifetime. Additionally, a house which is built at the 100-year flood level has about a one in four chance of being flooded in a 30-year mortgage life.

A 500-year frequency flood is defined as a flood having an average frequency of exceedence in the order of once in 500 years at a designated location, or a flood having a 0.2 percent chance of exceedence in any given year. A flood of this magnitude can be catastrophic, especially when it occurs in developed stream valleys.

Peak discharge-frequency relationships for various floods were determined for the study area following guidelines in Reference 2. Table 1 is a summary of peak discharges for three recurrence intervals (in years).

Table 1 - Peak Flows on Owasco Inlet

Location	Drainage Area (sq. mi.)	10-Year Discharge (cfs)	100-Year Discharge (cfs)	500-Year Discharge (cfs)
Downstream Study Limits at Northern Corporate Limit	19.8	1,500	2,700	3,700

Hazards and Damages of Large Floods

The extent of damage caused by any flood depends on the topography of the flooded area, the depth and duration of flooding, the velocity of flow, the rate of rise in water surface elevation, and development of the flood plain.

Deep water flowing at a high velocity and carrying floating debris would create conditions hazardous to persons and vehicles which attempt to cross the flood plain. Generally, water 3 or more feet deep which flows at a velocity of 3 or more feet per second could easily sweep an adult off his feet and create definite danger of injury or drowning. Rapidly rising and swiftly flowing floodwater may trap persons in homes that are ultimately destroyed or in vehicles that are ultimately submerged or floated. Since waterlines can be ruptured by deposits of debris and by the force of flood waters, there is the possibility of contaminated domestic water supplies. Damaged sanitary sewer lines and sewage treatment plants could result in pollution by floodwaters and could create health hazards. Isolation of areas by floodwater could create hazards in terms of medical, fire, or law enforcement emergencies.

Flood Profiles and Flooded Areas

Analyses of the hydraulic characteristics of Owasco Inlet were carried out to provide estimates of the elevations of the floods of the selected recurrence intervals. Cross-sectional data for the creek were obtained by field survey. Bridges were surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Plates 1,2). Selected cross-section locations are also shown on the Flooded Area Map (Plate 3).

The flood profiles were generated using the HEC-2 backwater program (Reference 3). Water surface profile computations were started just downstream from the northern corporate limit. Normal depth was assumed for the starting water surface elevations. Manning's "n" values varied from 0.03 to 0.06 for channel and 0.04 to 0.10 for overbank areas. From field observations, roughness coefficients were selected according to channel conditions, brush and other obstructions in overbank areas, presence of roads, parking lots and lawns, and other factors. Expansion and contraction coefficients of 0.3-0.5 and 0.1-0.3, respectively, were used in these computations. Water surface profiles were computed for several frequency flows listed in Table 1. Flood profiles were drawn showing computed water surface elevations for floods of the selected recurrence intervals. The 10, 100, and 500-year floods are shown on the profiles.

The reach from about 1,000 feet upstream from West South Street (Route 38) to the upstream limit of the study area was modeled by an approximate method due to the lack of surveyed cross sections in this area.

The hydraulic analyses for this study are based only on the effects of unobstructed flow. The flood elevations as shown on the profiles are, therefore, considered valid only if the bridges across Owasco Inlet remain unobstructed from debris or ice and if channel and overbank conditions remain essentially the same as ascertained during this study.

The areas that would be inundated by the 100-year and 500-year floods are shown on the Flooded Area Map. The actual limits of these overflow areas may vary somewhat from those shown on the maps because the scale of the maps and contour intervals do not permit precise plotting of the boundaries of the flooded area. Therefore, the profile elevations should be used to determine the flood elevations of a particular location along the stream.

All elevations are referenced from National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in the study are shown in Table 2.

Obstructions

During floods, debris collecting on bridges could decrease their flow-carrying capacity and cause greater water depths (backwater effect) upstream of these structures. Since the occurrence and amount of debris are indeterminate factors, only the physical characteristics of the structures were considered in preparing the profiles. No reduction in the carrying capacity from clogging or jamming was considered. Similarly, maps of the flooded area show the backwater effect of constricted bridge openings, but do not reflect increased water surface elevations that could be caused by debris or ice collecting against the structures.

UNIFIED FLOOD PLAIN MANAGEMENT

Historically, the alleviation of flood damage has been accomplished almost exclusively by the construction of protective works such as reservoirs, channel improvements, and floodwalls and levees. However, in spite of the

Table 2 - Elevation Reference Marks in the Study Area

Reference Mark	Elevation (NGVD) 1) (feet)	Description of Location
RM1	973.37	PK nail on sign for Wastewater Treatment Plant on Route 38 near north corporate limit.
RM2	1,000.09	Chiseled "x" on southeast bonnet bolt of hydrant, located on north side of Cortland St. ± 85' west of bridge over Owasco Inlet.
RM3	999.05	East bonnet bolt of fire hydrant on south side of Spring Street near Owasco Inlet ± 140' north of old railroad bridge.
RM4	994.12	USGS monument located on north wingwall east side of abandoned RR bridge with no deck, ± 260' north of old Groton rail station.
RM5	998.44	Chiseled "x" on guard rail bolt, downstream right abutment on West South Street bridge over Owasco Inlet, North bolt of most east base plate.
RM6	1,009.92	Hydrant, top of "o" on "open", located near 55 mph sign just south of high school on west side of Route 38, ± 2,000 north of south corporate limit.

1) Approximate location of the elevation reference marks are shown on the flooded area map.

billions of dollars that have already been spent for construction of well-designed and efficient flood control works, annual flood damages continue to increase because the number of persons and structures occupying floodprone lands is increasing faster than protective works can be provided.

Recognition of this trend in recent years has forced a reassessment of the flood control concept and resulted in the broadened concept of unified flood plain management programs. Legislative and administrative policies frequently cite two approaches: structural and nonstructural, for adjusting to the flood hazard. In this context, "structural" is usually intended to mean adjustments that modify the behavior of floodwaters through the use of measures such as public works' dams and channel work. "Nonstructural" is usually intended to include all other adjustments in the way society acts when occupying or modifying a flood plain (e.g., regulations, floodproofing, insurance, etc.). Both structural and nonstructural tools are used for achieving desired future flood plain conditions. There are three basic strategies which may be applied individually or in combination: (1) modifying the susceptibility to flood damage and disruption, (2) modifying the floods

themselves, and (3) modifying (reducing) the adverse impacts of floods on the individual and the community.

Modify Susceptibility to Flood Damage and Disruption

The strategy to modify susceptibility to flood damage and disruption consists of actions to avoid dangerous, economically undesirable, or unwise use of the flood plain. Responsibility for implementing such actions rests largely with the non-Federal sector and primarily at the local level of Government.

These actions include restrictions in the mode and the time of occupancy; in the ways and means of access; in the pattern, density, and elevation of structures and in the character of their materials (structural strength, absorptiveness, solubility, corrodibility); in the shape and type of buildings and in their contents; and in the appurtenant facilities and landscaping of the grounds. The strategy may also necessitate changes in the interdependencies between flood plains and surrounding areas not subject to flooding, especially interdependencies regarding utilities and commerce. Implementing mechanisms for these actions include land use regulations, development and redevelopment policies, floodproofing, disaster preparedness and response plans, and flood forecasting and warning systems. Different tools may be more suitable for developed or underdeveloped flood plains or to urban or rural areas. The information contained in this report is particularly useful for the preparation of flood plain regulations.

a. Flood Plain Regulations.

Flood plain regulations apply to the full range of ordinances and other means designed to control land use and construction within floodprone areas. The term encompasses zoning ordinances, subdivision regulations, building and housing codes, encroachment line statutes, open area regulations, and other similar methods of management which affect the use and development of floodprone areas.

Flood plain land use management does not prohibit use of floodprone areas; to the contrary, flood plain land use management seeks the best use of flood plain lands. The flooded area maps and the water surface profiles contained in this report can be used to guide development in the flood plain. The elevations shown on the profiles should be used to determine flood heights because they are more accurate than the outlines of flooded areas. Development in areas susceptible to frequent flooding should consist of construction which has a low damage potential such as parking areas and golf courses. If high value construction such as buildings are considered for areas subject to freauent flooding, the land should be elevated to minimize damages. If it is uneconomical to elevate the land in these areas, means of floodproofing the structures should be given careful consideration.

b. Development Zones.

A flood plain normally consists of two useful zones. The first zone is the designated "floodway" or that cross sectional area required for carrying or discharging the anticipated flood waters with a maximum 1-foot increase in

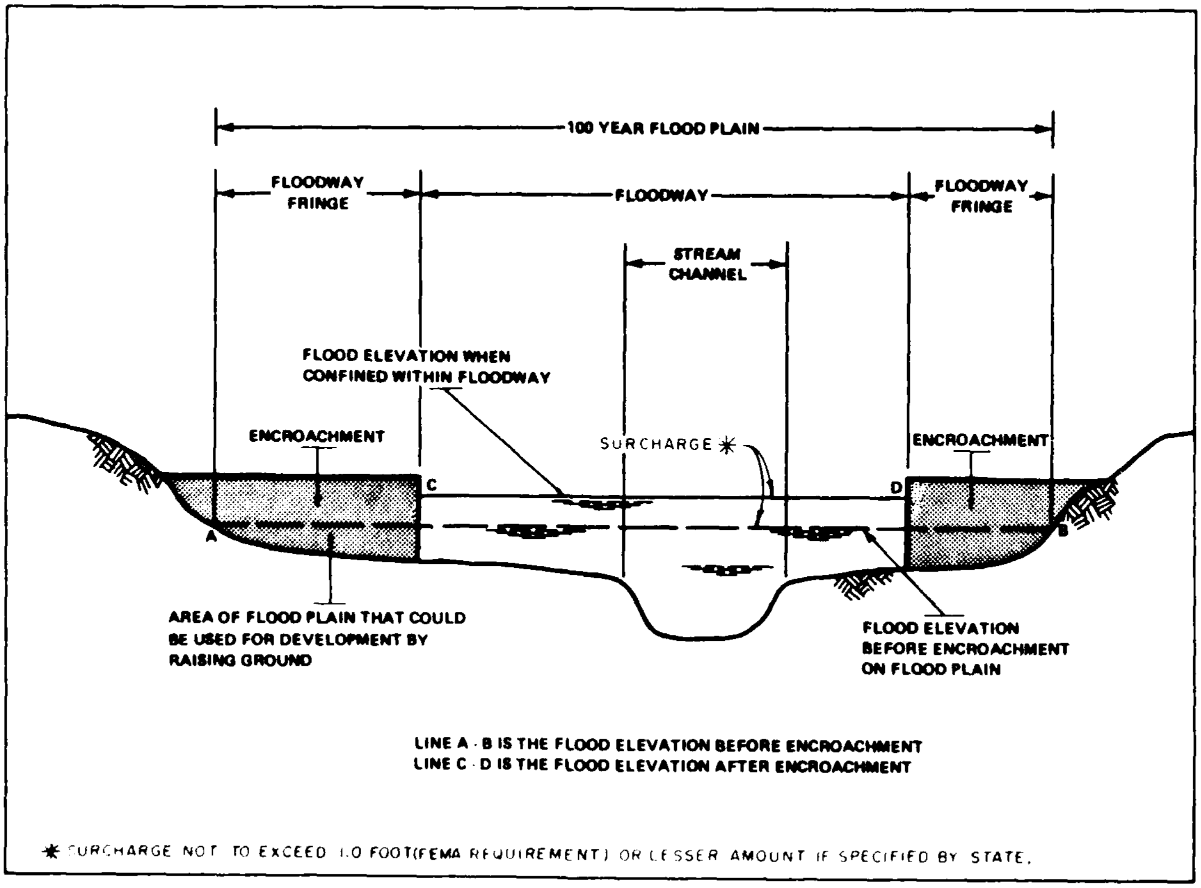
flood level. Velocities are greatest and most damaging in the floodway. Regulations essentially maintain the flow-conveying capability of the floodway to minimize inundation of additional adjacent areas. Uses which are acceptable for floodways include parks, parking areas, open spaces, etc.

An approximate floodway was developed from the southern corporate limit to about 1,000 feet south of South Street. There was a limited number of surveyed cross sections in this reach.

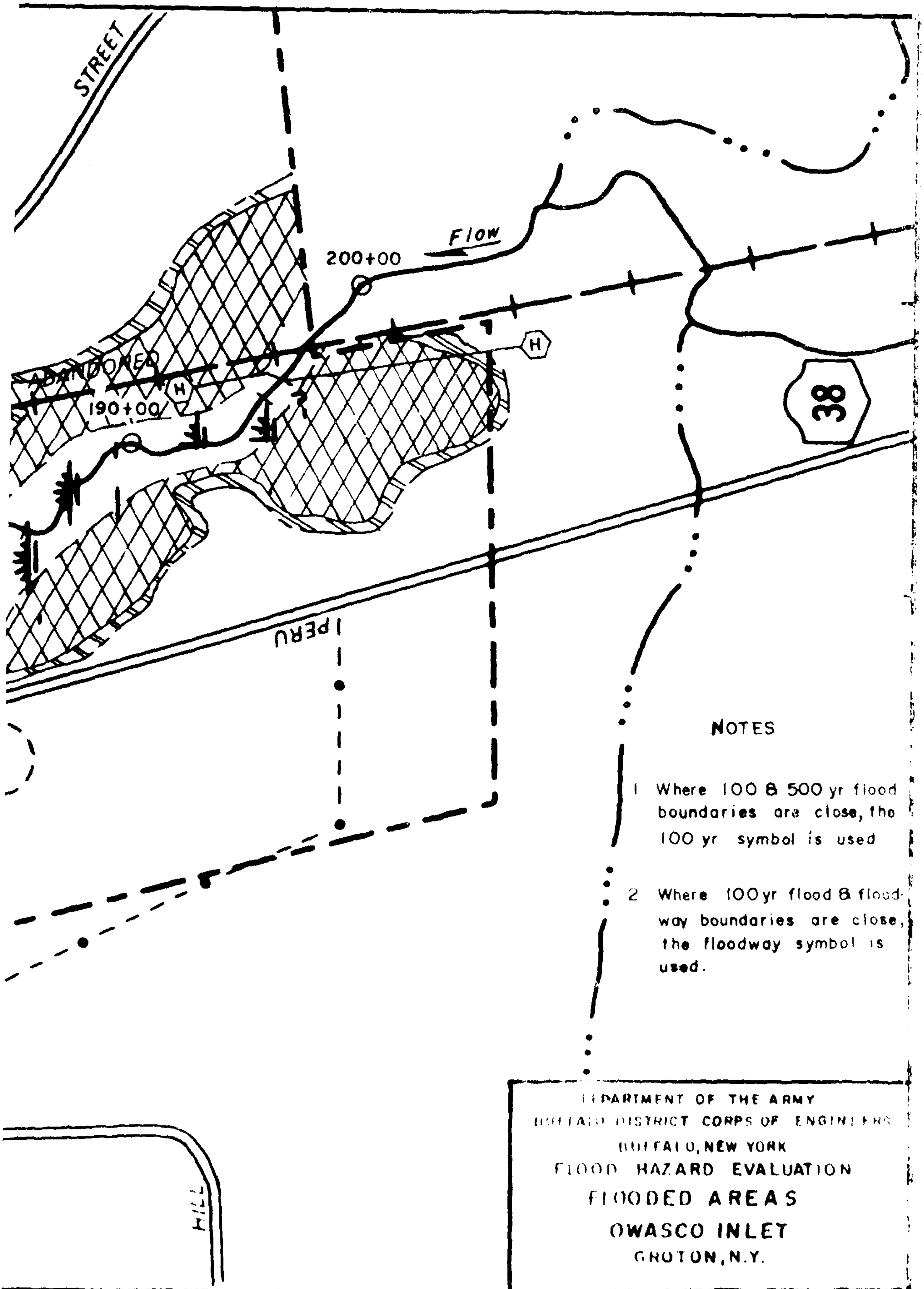
The second zone of the flood plain is termed the "floodway fringe" or restrictive zone, in which inundation might occur but where depths and velocities are generally low. Such areas can be developed provided structures are placed high enough or floodproofed to be reasonably free from flood damage during the Base (100-year) Flood. Typical relationships between the floodway and floodway fringe are shown in Figure 1.

c. <u>Formulation of Flood Plain Regulations</u>

Formulation of flood plain regulations in a simplified sense involves selecting the type and degree of control to be exercised for each specific flood plain. In principal, the form of the regulations is not as important



FLOODWAY SCHEMATIC FIGURE 1



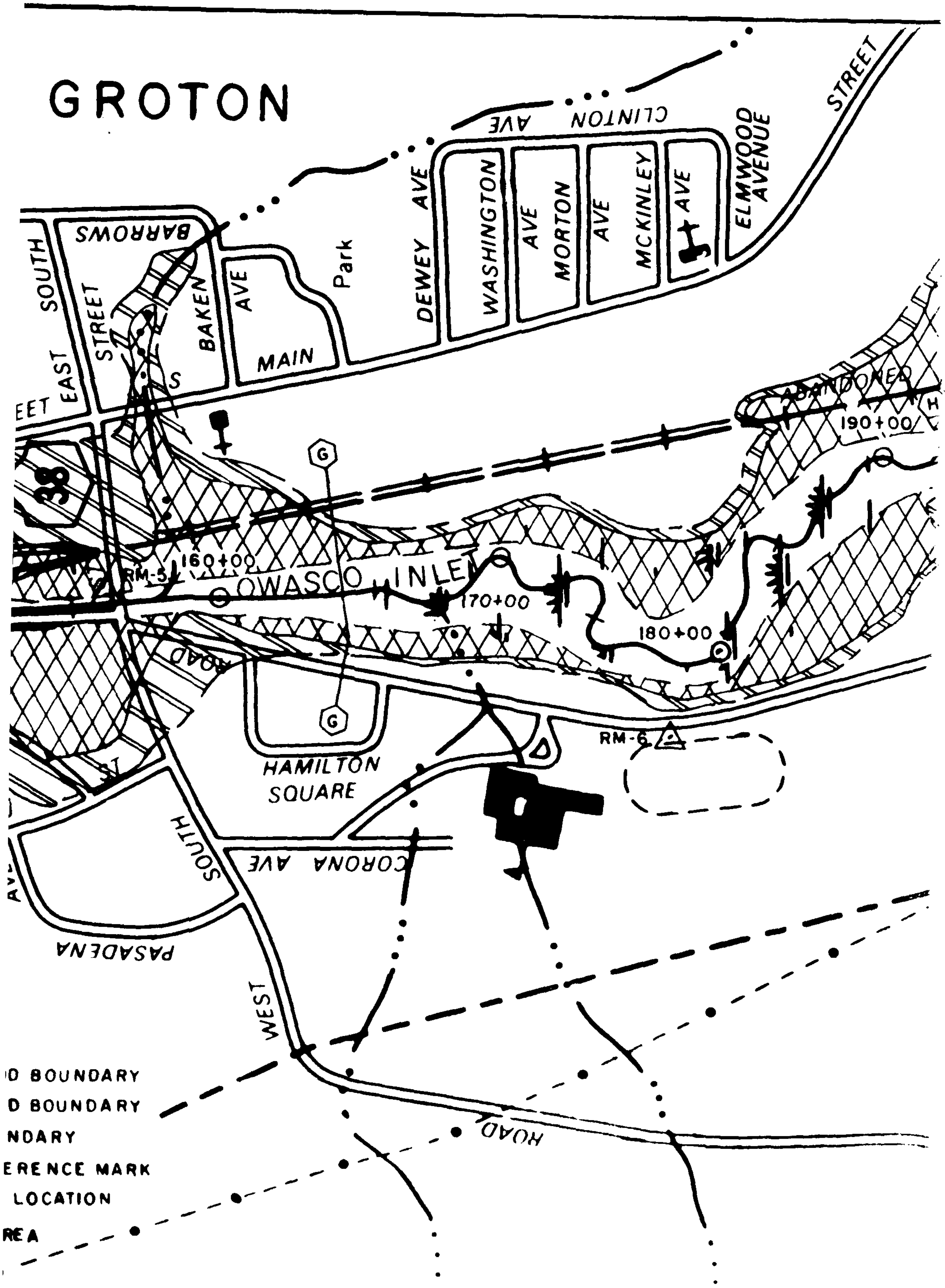
NOTES

1. Where 100 & 500 yr flood boundaries are close, the 100 yr symbol is used

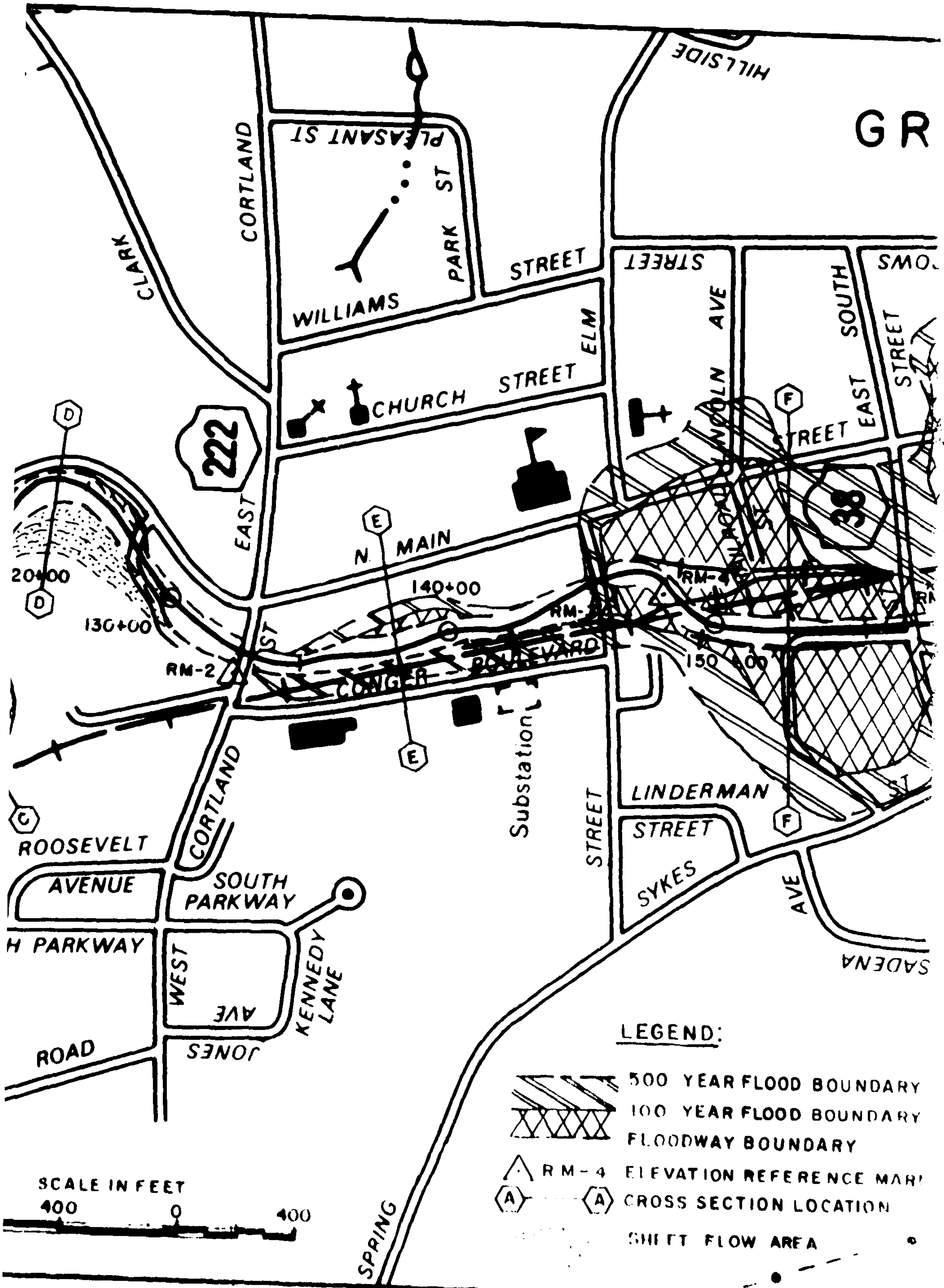
2. Where 100 yr flood & floodway boundaries are close, the floodway symbol is used.

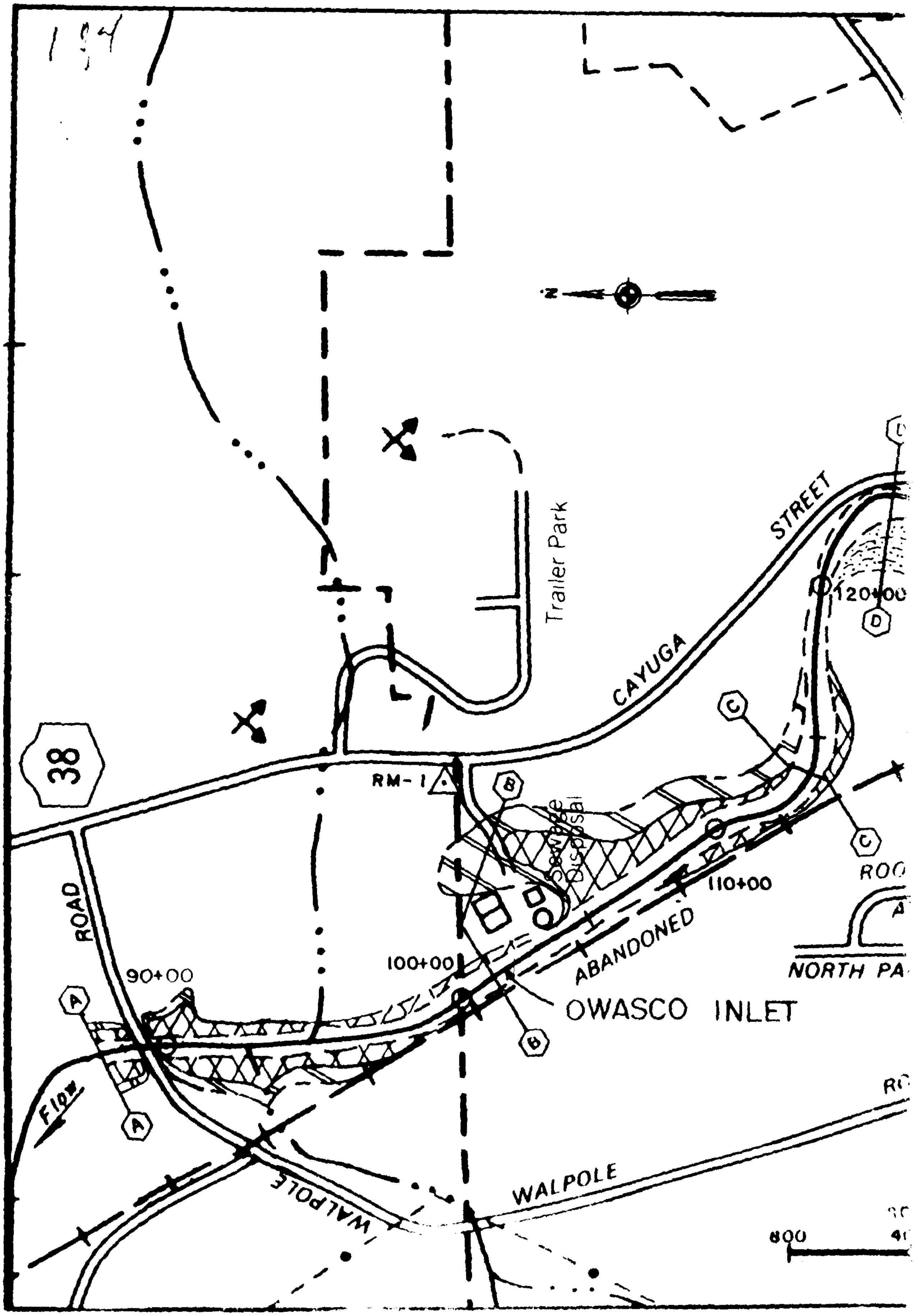
DEPARTMENT OF THE ARMY
BUFFALO DISTRICT CORPS OF ENGINEERS
BUFFALO, NEW YORK
FLOOD HAZARD EVALUATION
FLOODED AREAS
OWASCO INLET
GROTON, N.Y.

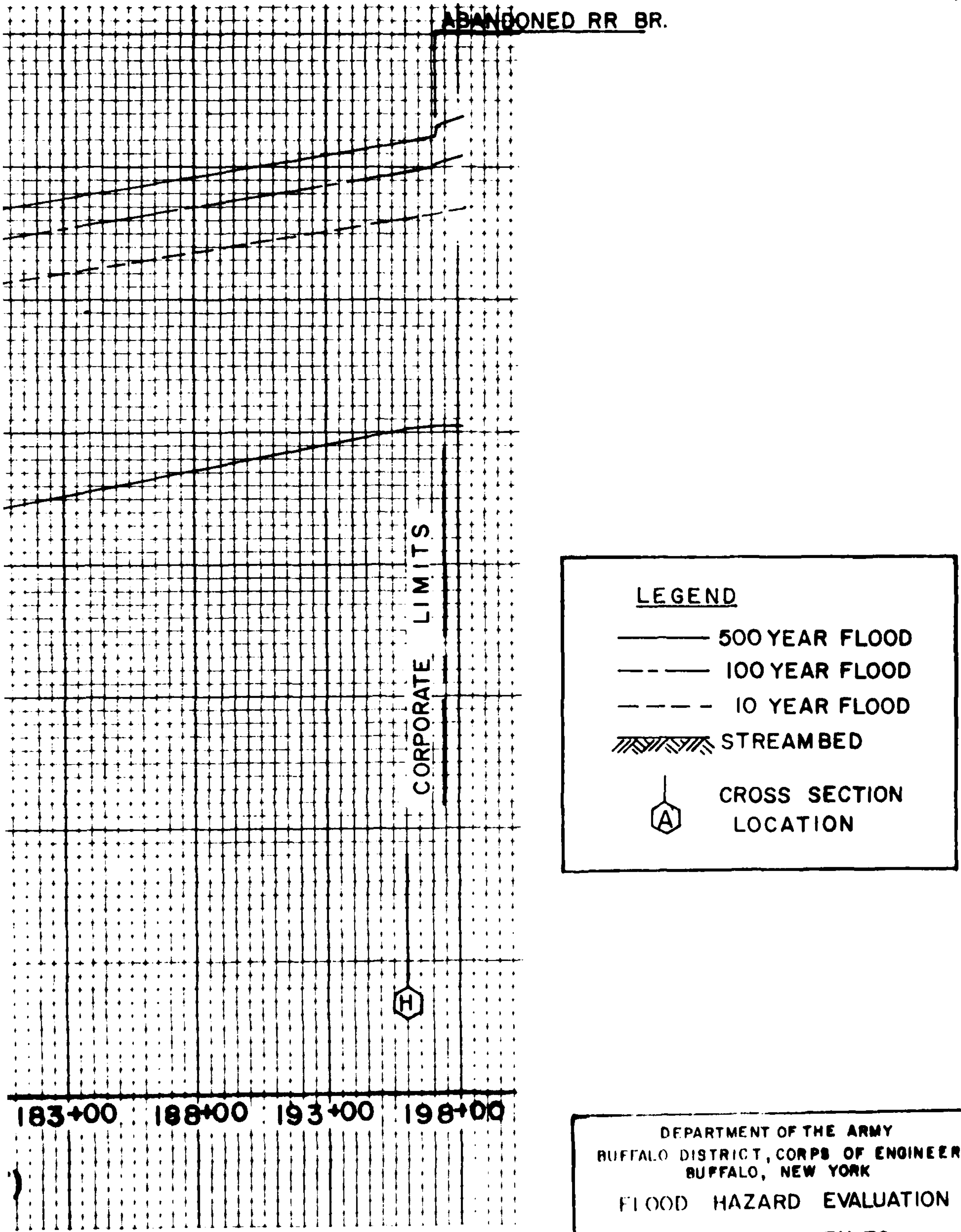
PLATE



GROTON
CLINTON AVE
STREET
ELMWOOD AVENUE
AVE
MCKINLEY
AVE
MORTON
AVE
WASHINGTON
DEWEY AVE
Park
BARROWS
AVE
MAIN
BAKEN
SOUTH
STREET
EAST
EET
ABANDONED
190+00
38
160+00
RM-5
OWASCO INLET
170+00
180+00
ROAD
HAMILTON SQUARE
RM-6
CORONA AVE
SOUTH
PASADENA
WEST
ROAD
D BOUNDARY
D BOUNDARY
NDARY
ERENCE MARK
LOCATION
REA


GR
HILLSIDE
PLEASANT ST
PARK ST
CORTLAND
CLARK
WILLIAMS
STREET
CHURCH
STREET
ELM
LINCOLN AVE
SOUTH
EAST
STREET
222
EAST
N. MAIN
38
20+00
130+00
140+00
150+00
RM-2
RM-3
RM-4
CONGER
BOULEVARD
Substation
CORTLAND
ROOSEVELT
AVENUE
SOUTH PARKWAY
H PARKWAY
WEST
AVE
KENNEDY LANE
JONES
ROAD
STREET
LINDERMAN
STREET
SYKES
AVE
SADENA
SPRING
LEGEND:
500 YEAR FLOOD BOUNDARY
100 YEAR FLOOD BOUNDARY
FLOODWAY BOUNDARY
RM-4 ELEVATION REFERENCE MARK
CROSS SECTION LOCATION
SHEET FLOW AREA
SCALE IN FEET
400
0
400


194
Trailer Park
CAYUGA
STREET
38
RM-1
ROAD
90+00
100+00
110+00
120+00
Sewage Disposal
ABANDONED
OWASCO INLET
NORTH PA
ROO
Flow
WALPOLE
WALPOLE
RO
800
A
B
C
D



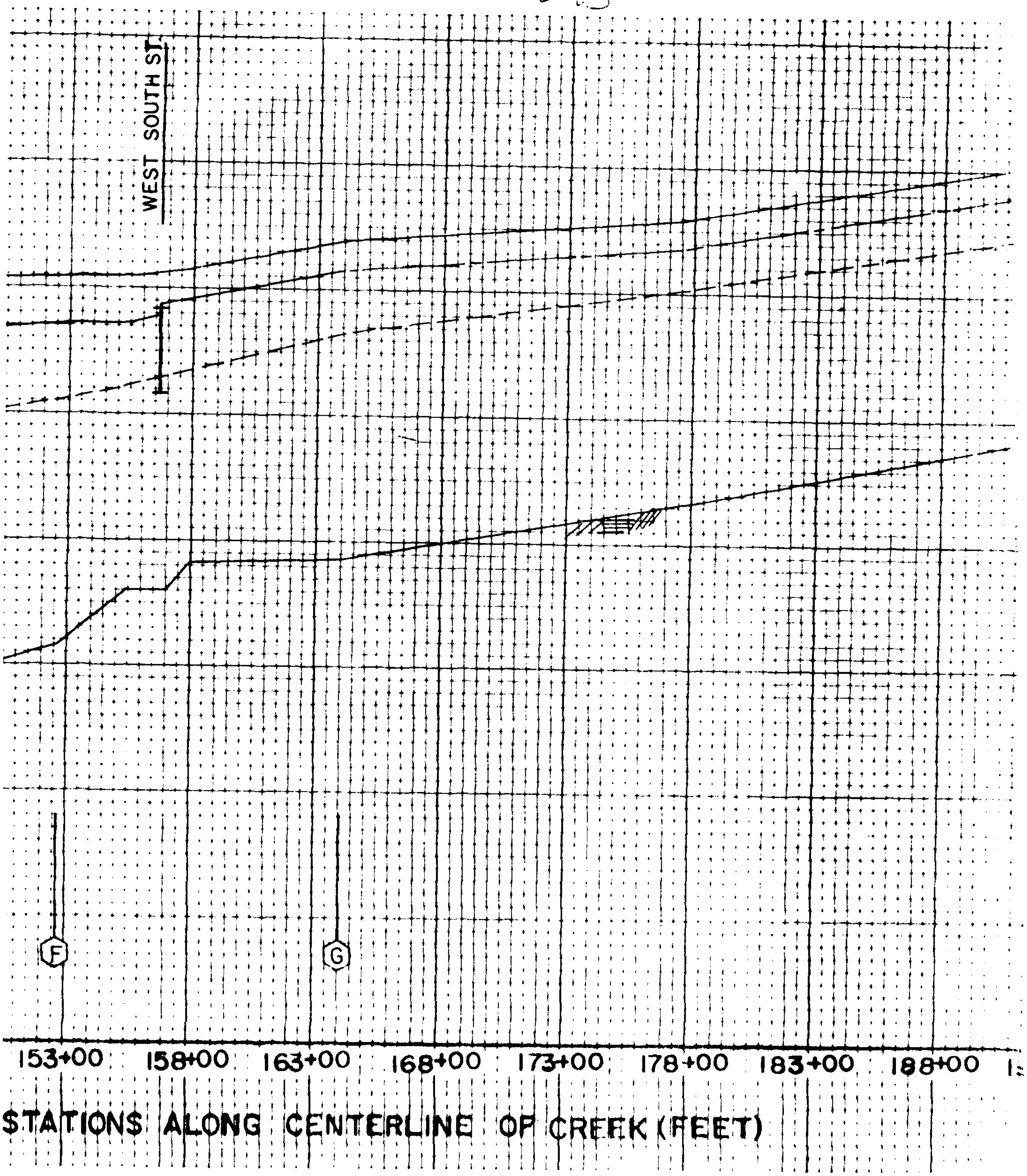
DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
BUFFALO, NEW YORK

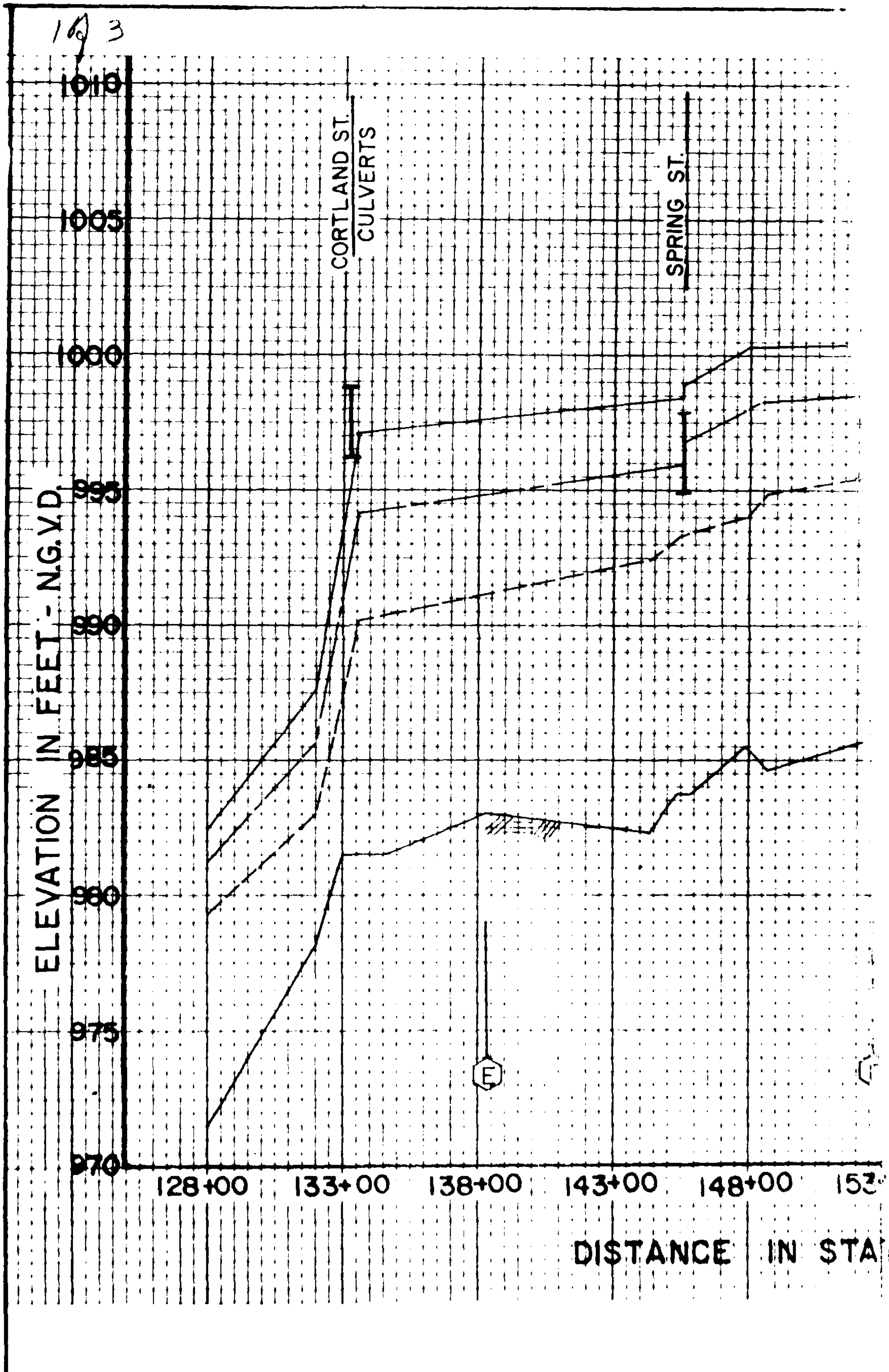
FLOOD HAZARD EVALUATION

FLOOD PROFILES
OWASCO INLET
GROTON, N. Y.

PLATE 2

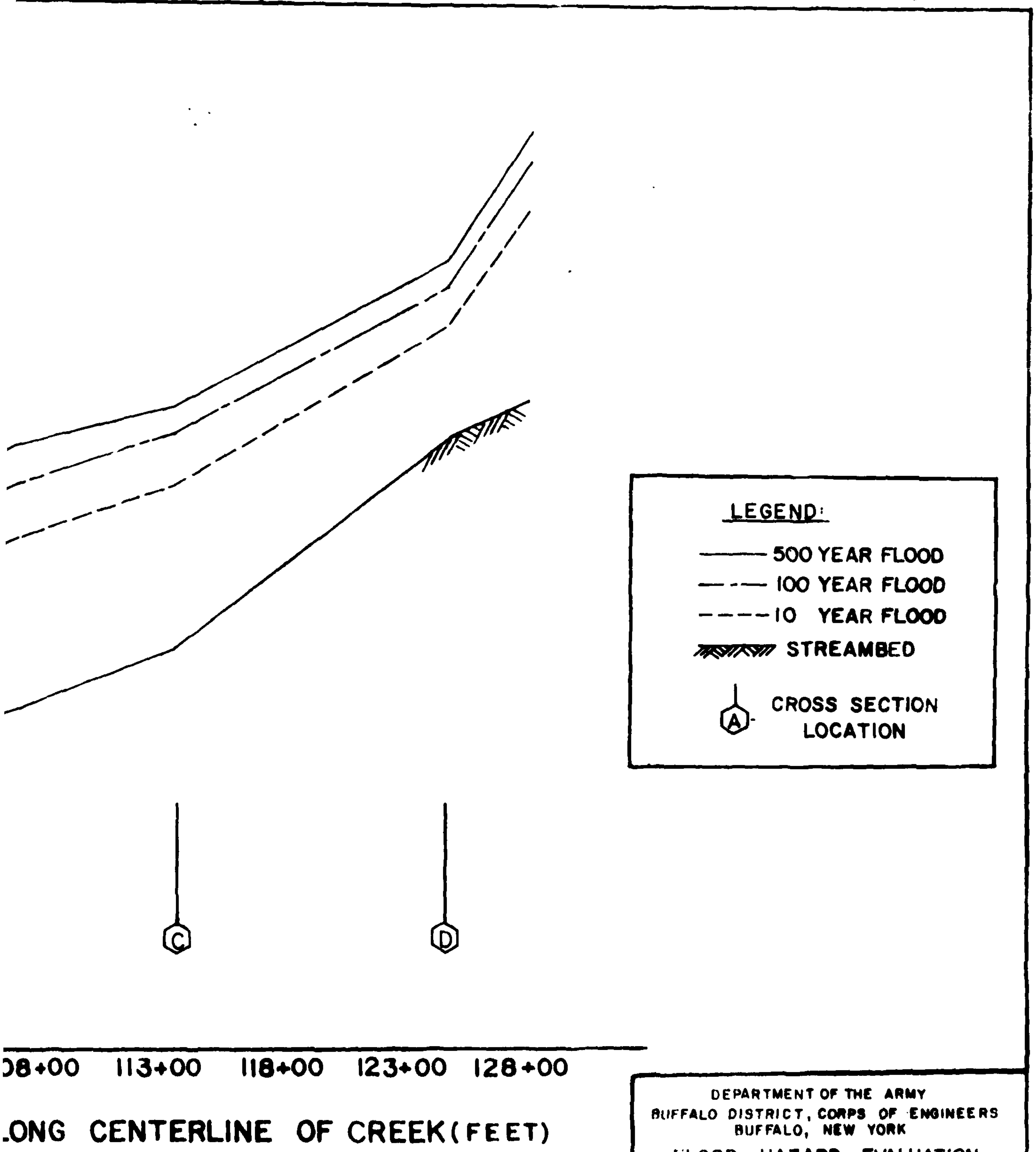
2B3


WEST SOUTH ST.
F
G
153+00
158+00
163+00
168+00
173+00
178+00
183+00
188+00
STATIONS ALONG CENTERLINE OF CREEK (FEET)



16 3
1010
1005
1000
995
990
985
980
975
970
CORTLAND ST. CULVERTS
SPRING ST.
E
ELEVATION IN FEET - N.G.V.D.
128+00
133+00
138+00
143+00
148+00
DISTANCE IN STA

2 of 2



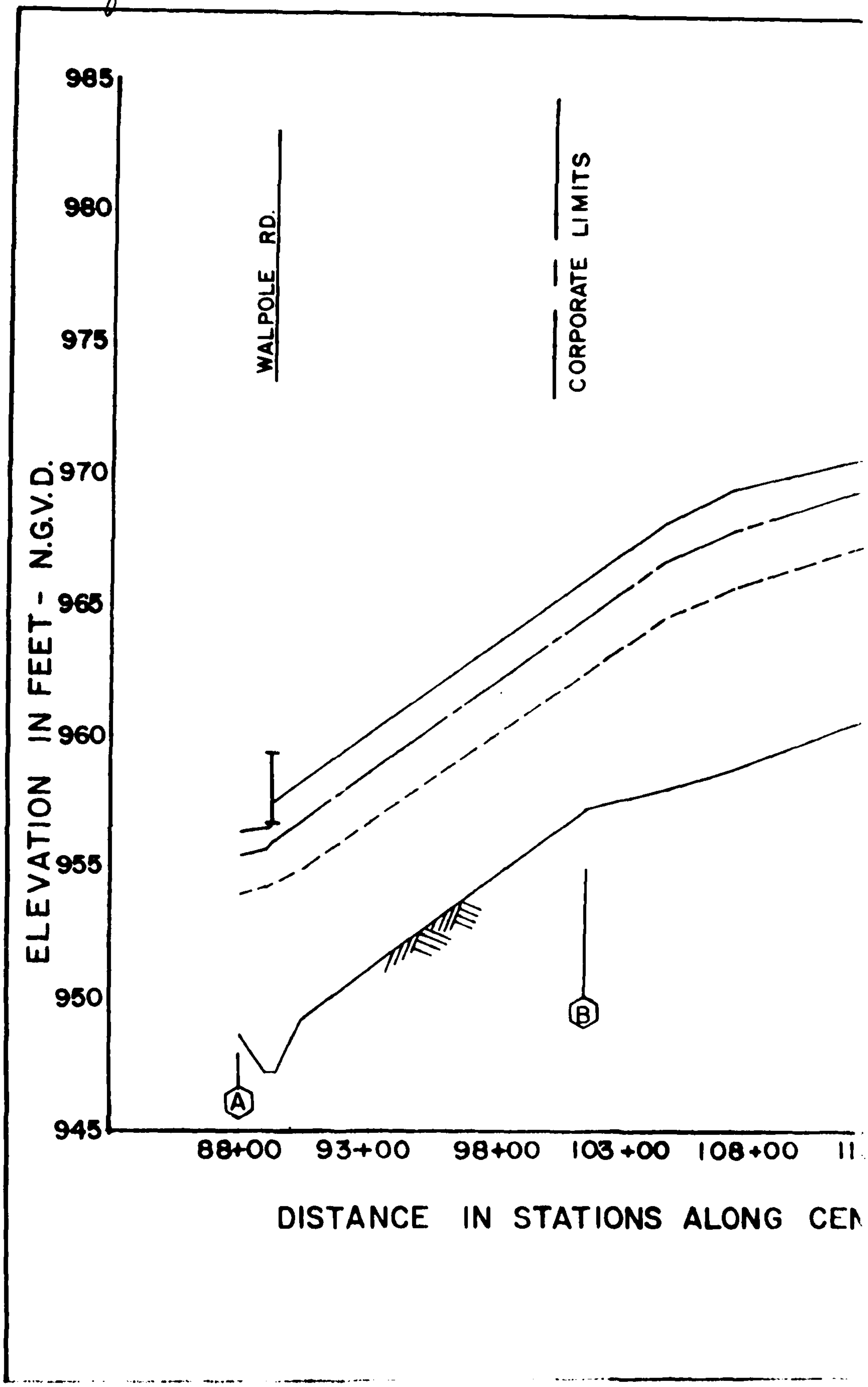
DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
BUFFALO, NEW YORK

FLOOD HAZARD EVALUATION

FLOOD PROFILES
OWASCO INLET
GROTON, N. Y.

PLATE I

1 8 2



ELEVATION IN FEET - N.G.V.D.
985
980
975
970
965
960
955
950
945
WALPOLE RD.
CORPORATE LIMITS
A
B
88+00
93+00
98+00
103+00
108+00
DISTANCE IN STATIONS ALONG CEN

BIBLIOGRAPHY

1. U.S. Army Corps of Engineers, Buffalo District, Flood Plain Information Report Owasco Inlet and Hemlock Creek, Villages of Moravia and Locke Cayuga County, NY, July 1976.

2. U.S. Water Resources Council, Hydrology Committee, Bulletin No. 17B, Guidelines for Determining Flood Flow Frequency, Revised September 1981.

3. U.S. Army Corps of Engineers, Hydrologic Engineering Center, Computer Program 723-X6-L202A, HEC-2, Water Surface Profiles, Davis, California, August 1979, with updates.

4. U.S. Army Corps of Engineers, Floodway Design Considerations, September 1978.

FLOOD PROFILE — A graph showing the relationship of water surface elevation to location; the latter generally expressed as distance upstream from mouth for a stream of water that flows in an open channel. It is generally drawn to show surface elevation for the crest of a specific flood, but may be prepared for conditions at a given time or stage.

FLOOD STAGE — The stage or elevation at which overflow of the natural banks of a stream or body of water begins in the reach or area in which the elevation is measured.

FLOODWAY — The channel of a watercourse and those portions of the adjoining flood plain required to provide for the passage of the selected flood (normally the 100-year flood) with an insignificant increase in the flood levels above that of natural conditions. As used in the National Flood Insurance Program, floodways must be large enough to pass the 100-year flood without causing an increase in elevation of more than a specified amount (1 foot in most areas).

RECURRENCE INTERVAL — A statistical expression of the average time between floods exceeding a given magnitude (see FLOOD FREQUENCY).

GLOSSARY

BACKWATER	The resulting high water surface in a given stream due to a downstream obstruction or high stages in an intersecting stream.
BASE FLOOD	A flood which has an average return interval in the order of once in 100 years, although the flood may occur in any year. It is based on statistical analysis of streamflow records available for the watershed and analysis of rainfall and runoff characteristics in the general region of the watershed. It is commonly referred to as the "100-year flood."
DISCHARGE	The quantity of flow in a stream at any given time, usually measured in cubic feet per second (cfs).
FLOOD	An overflow of lands not normally covered by water. Floods have two essential characteristics: The inundation of land is temporary and the lands are adjacent to and inundated by overflow from a river, stream, ocean, lake, or other body of standing water. Normally a "flood" is considered as any temporary rise in streamflow or stage, but not the ponding of surface water that results in significant adverse effects in the vicinity. Adverse effects may include damages from overflow of land areas, temporary backwater effects in sewers and local drainage channels, creation of unsanitary conditions or other unfavorable situations by deposition of materials in stream channels during flood recessions, and rise of groundwater coincident with increased streamflow.
FLOOD CREST	The maximum stage or elevation reached by floodwaters at a given location.
FLOOD FREQUENCY	A statistical expression of the percent chance of exceeding a discharge of a given magnitude in any given year. For example, a 100-year flood has a magnitude expected to be exceeded on the average of once every hundred years. Such a flood has a 1 percent chance of being exceeded in any given year. Often used interchangeably with RECURRENCE INTERVAL.
FLOOD PLAIN	The areas adjoining a river, stream, watercourse, ocean, lake, or other body of standing water that have been or may be covered by floodwater.

CONCLUSIONS

This report presents local flood hazard information for Owasco Inlet in the the village of Groton. The U.S. Army Corps of Engineers, Buffalo District, will provide interpretation and limited technical assistance in the application of the data contained in this report, , .rticularly as to its use in developing effective flood plain regulations. Requests should be coordinated through the New York State Department of Environmental Conservation.

as a maintained adequacy of control. The degree of control normally varies with the flood hazard as measured by depth of inundation, velocity of flow, frequency of flooding, and the need for available land. Considerable planning and research is required for the proper formulation of flood plain regulations. Where formulation of flood plain regulations is envisioned to require a lengthy period of time during which development is likely to occur, temporary regulations should be adopted to be amended later as necessary.

Modify Flooding

The traditional strategy of modifying floods through the construction of dams, dikes, levees, and floodwalls, channel alterations, high flow diversions and spillways, and land treatment measures has repeatedly demonstrated its effectiveness for protecting property and saving lives, and it will continue to be a strategy of flood plain management. However, in the future, reliance solely upon a flood modification strategy is neither possible nor desirable. Although the large capital investment required by flood modifying tools has been provided largely by the Federal Government, sufficient funds from Federal sources have not been, and are not likely to be available to meet all situations for which flood modifying measures would be both effective and economically feasible. Another consideration is that the cost of maintaining and operating flood control structures fall upon local governments except for major Federal reservoirs with flood control storage.

Flood modifications acting alone leave a residual flood loss potential and can encourage an unwarranted sense of security leading to inappropriate use of lands in the areas that are directly protected or in adjacent areas. For this reason, measures to modify possible floods should usually be accompanied by measures to modify the susceptibility to flood damage, particularly by land use regulations.

Flood modifying tools permit changes in the volume of runoff, in the peak stage of the flood, in the time of rise and duration, in the extent of the area flooded, in the velocity and depth of floodwaters, and consequently in the amount of debris, sediment, and pollutants that floods carry.

Modify the Impact of Flooding on Individuals and the Community

A third strategy for mitigating flood losses consists of actions designed to assist individuals and communities in their preparatory, survival, and recovery responses to floods. Tools include information dissemination and education, arrangements for spreading the costs of the loss over time, and transfer of some of the individual's loss to the community by reducing taxes on flood prone areas.

The distinction between a reasonable and unreasonable transfer of costs from the individual to the community can also be regulated and is a key to effective flood plain management.

END

FILMED

9-85

DTIC